IN THE CLAIMS

Please cancel claims 1-26 without prejudice to subsequent revival.

Please add new claims 27-49 as follows.

27. (new) A soluble, fused major histocompatibility complex (MHC) class II heterodimer, which forms a peptide binding groove that associates with an antigenic peptide, the MHC class II heterodimer comprising the following elements covalently linked in sequence:

a first polypeptide segment consisting essentially of a β1 domain of an MHC class II chain;

a first peptide linker segment; and

a second polypeptide segment consisting essentially of an α1 domain of an MHC class II chain, wherein said β1 domain and said α1 domain form the peptide binding groove of the MHC class II heterodimer.

28. (new) The MHC class II heterodimer of claim 27, wherein the MHC class II heterodimer further comprises:

a third polypeptide segment comprising an antigenic peptide that associates with the peptide binding groove of the MHC class II heterodimer; and

a second peptide linker segment connecting the third and first polypeptide segments.

29. (new) The MHC class II heterodimer of claim 27, wherein the MHC class II β1 domain is from a human DR1β*1501 β1 domain.

30. (new) The MHC class II heterodimer of claim 27, wherein the MHC class II α 1 domain is from a human DRA*0101 α1 domain.

31. (new) The MHC class II heterodimer of claim 27, wherein the first peptide linker is about 5 to about 25 amino acids in length.

32. (new) The MHC class II heterodimer of claim 28, wherein the first and the second peptide linkers are about 5 to about 25 amino acids in length.

33. (new) The MHC class II heterodimer of claim 31 or 32, wherein the first peptide linker segment has the sequence GASAG (SEQ ID NO:29) or GGSGGS (SEQ ID NO:31).

34. (new) The MHC class II heterodimer of claim 32, wherein the second peptide linker segment has the sequence GASAG (SEQ ID NO:29) or GGSGGS (SEQ ID NO:31).

35. (new) The MHC class II heterodimer of claim 28, wherein the third polypeptide segment is antigenic peptide capable of stimulating a CD4+ helper T cell-mediated immune response.

36. (new) The MHC class II heterodimer of claim 35, wherein the third polypeptide segment is a peptide selected from the group consisting of SEQ ID NO:59, SEQ ID NO:61, SEQ ID NO:40, SEQ ID NO:39, and SEQ ID NO:33.

37. (new) A pharmaceutical composition comprising a soluble, fused MHC class II heterodimer of claim 27 in combination with a pharmaceutically acceptable carrier.

38. (new) A pharmaceutical composition comprising a soluble, fused MHC class II heterodimer:peptide complex of claim 28 in combination with a pharmaceutically acceptable carrier.

39. (new) An expression cassette encoding a soluble, fused major histocompatibility complex (MHC) class II heterodimer, which forms a peptide binding groove that associates with an antigenic peptide, the expression cassette comprising the following operably linked elements:

a transcription promoter;

a first nucleic acid segment encoding a first polypeptide segment consisting essentially of a β1 domain of an MHC class II chain;

a second nucleic acid segment encoding a second polypeptide segment consisting essentially of an α1 domain of an MHC class II chain; and

a first linker segment encoding a first peptide linker and connecting in-frame the first and second nucleic acid segments; wherein said β1 domain and said α1 domain form the peptide binding groove of the MHC class II heterodimer.

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40. (new) The expression cassette of claim 39, further comprising:

a third nucleic acid segment encoding a third polypeptide segment comprising an antigenic peptide that associates with the peptide binding groove of the MHC class II heterodimer; and

a second linker segment encoding a second peptide linker and connecting in-frame the third and first nucleic acid segments.

41. (new) The expression cassette of claim 39, wherein the MHC class II β1 domain is from a human DR1β*1501 β1 domain.

42. (new) The expression cassette of claim 39, wherein the MHC class II α1 domain is from a human DRA*0101 α1 domain.

43. (new) The expression cassette of claim 39 or 40, wherein the first linker segment encodes a first peptide linker having the sequence GASAG (SEQ ID NO:29) or GGSGGS (SEQ ID NO:31).

44. (new) The expression cassette of claim 40, wherein the second linker segment encodes a second peptide linker having the sequence GASAG (SEQ ID NO:29) or GGSGGS (SEQ ID NO:31).

45. (new) The expression cassette of claim 40, wherein the third nucleic acid segment encodes an antigenic peptide capable of stimulating a CD4+ helper T cell-mediated immune response.

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46. (new) The expression cassette of claim 39, further comprising an additional nucleic acid segment encoding a signal sequence.

47. (new) The expression cassette of claim 39, wherein the first linker segment encodes a first peptide linker of about 5 to about 25 amino acids.

48. (new) The expression cassette of claim 40, wherein the first linker segment and the second linker segment encode a first and a second peptide linker of about 5 to about 25 amino acids.

49. (new) The MHC class II heterodimer of claim 40, wherein the third nucleic acid segment encodes a peptide selected from the group consisting of SEQ ID NO:59, SEQ ID NO:61, SEQ ID NO:40, SEQ ID NO:39, and SEQ ID NO:33.

REMARKS

With this amendment, Applicants request entry of new claims 27-49 in the patent application. These claims replace originally filed claims 1-26.

The invention

The present invention relates to single chain, MHC class II heterodimers that are capable of associating with a peptide and presenting the peptide to a T cell receptor. In particular, the invention relates to the discovery that such MHC class II:peptide complexes can